

**DISCOVERY SERVICES:
A WHITE PAPER FOR THE TEXAS STATE LIBRARY & ARCHIVES COMMISSION**

**BY
ARTA KABASHI, CHRISTINE PETERSON, AND TIM PRATHER
AMIGOS LIBRARY SERVICES**

**REVISED BY
CHRISTINE PETERSON
AMIGOS LIBRARY SERVICES**

AUGUST 2014, REVISED AUGUST 2015

*Funded by the U.S. Institute of Museum and Library Services through a grant to the Texas State
Library and Archives Commission*

EXECUTIVE SUMMARY

Discussions among libraries that have recently implemented discovery services are likely to result in agreement that implementation was challenging. However, once implemented, librarians are generally happy with their decisions to offer discovery services to their patrons. Based on librarian experiences of both the challenges and rewards of implementing a discovery service, the Texas State Library and Archives Commission (TSLAC) contracted with Amigos Library Services to write a white paper that would include basic information concerning discovery services, as well as an overview of the major discovery vendors. Below is an overview of information contained in this document.

DEFINITIONS

From NISO: These services use an aggregated central index to enable searching across a wide range of library related resources – both licensed and free – from multiple providers. They also offer more sophisticated capabilities and faster performance than those provided by systems relying on federated search technologies.

For patrons: Google-like search experience for all library resources.

For librarians: A web-scale, index-based search service that includes local and remote library resources, including full-text article-level content as well as delivery of physical resources.

CURRENT STATE OF DISCOVERY SERVICES

Basic functionality for discovery services is currently available. Additional work is necessary that will allow this technology to work to its potential: best practices, communication between the discovery service and the content provider, and stability.

ADVANTAGES

- Leverages a library's existing resources
- Single interface for searching multiple resources
- Clear starting point for research
- Search results are more specific to a patron's needs than using a search engine
- Results are displayed more quickly than in federated searches
- Allows patrons to see and evaluate what is available immediately as well as those that will take more time

DISADVANTAGES

- Implementation costs for a discovery service include more than the cost of the service. Other costs include staff time to map data elements of the databases,

to understand how the service defines terms like “relevancy” and to determine how to teach and market it.

- Patrons have an expectation that everything is available when using a single search box, but that may not be true.
- Integrating your ILS into a discovery system will take time.

LIMITATIONS

- Completeness. Not all resources work well in a discovery service.
- Relevancy ranking. It is difficult to perfect relevancy searching when the metadata is coming from many disparate sources.
- Speed. How quickly results display is dependent on many things, and sometimes performance is slower than anticipated.

AREAS OF A LIBRARY MOST IMPACTED BY A DISCOVERY SERVICE

- Staff who have responsibility for the library’s website
- Librarians who deal with e-resources
- Reference staff
- Cataloging and metadata staff
- Librarians who provide bibliographic instruction
- Interlibrary loan librarians

WHAT TO LOOK FOR IN A DISCOVERY SERVICE

- Usage statistic functionality
- How relevancy is determined
- What is included in the central index
- How the discovery layer works

BEST PRACTICES FOR IMPLEMENTING A DISCOVERY SERVICE

Steps to implementing a discovery service should include:

- Identify target audience
- Build a central index that includes databases of interest to your target audience(s)
- Set up the authentication process
- Customize the service
- Design the default presentation of the search box
- Refine search and retrieval options
- Test usability
- Enhance the service by integrating with other services such as Blackboard, LibGuides, RefWorks and Zotero

- Provide instruction and documentation of the service

EVALUATING A DISCOVERY SERVICE

- Work with the selected vendor and key project stakeholders to identify and troubleshoot the efficiency of the new system
- Recognize how your new discovery system covers resources and indexes them, what you can learn from usage statistics and relevancy rankings and how your selected vendor interacts with you on an on-going basis
- Understand the contractual agreements and the type of support you should receive
- Measure resource usage against what the vendor advertises
- Utilizing usage statistics, determine which library resources are being found and which are not
- Determine how your discovery vendor determines relevance
- Determine how you will test to evaluate the discovery service
- Be aware of new developments or enhancements to your system

APPENDIX A: MAJOR VENDORS FOR DISCOVERY SERVICES

- [BiblioCommons](#)
- [Blacklight](#)
- [EBSCO Discovery Services](#)
- [Ex Libris Primo](#)
- [Innovative Encore](#)
- [OCLC WorldCat Discovery](#)
- [ProQuest Summon Service](#)
- [SeeSearch](#)
- [VuFind](#)

APPENDIX B: WHAT TO LOOK FOR IN A DISCOVERY SERVICE

APPENDIX C: EVALUATING YOUR DISCOVERY SERVICE

APPENDIX D: ADVICE FOR LIBRARIES CONSIDERING THEIR FIRST DISCOVERY SERVICE FROM LIBRARIES THAT HAVE ALREADY IMPLEMENTED

APPENDIX E: BIBLIOGRAPHY (2012-PRESENT)

APPENDIX F: 2015 UPDATE CHANGES

Since the advent of Google's single search box, libraries have wanted to provide a similar experience. Unfortunately, searching across web-based resources is much different than searching across the variety of resources libraries provide. Even so, library discovery service vendors strive to do just that.

This paper attempts to provide an overview of discovery services, including their advantages, disadvantages, limitations and best practices. In addition, a synopsis of the major discovery vendors is provided in Appendix A.

OVERVIEW

Discovery services started appearing in 2009. They were a direct result of three changes in library and technical environments:

1. Less than satisfactory results using federated searching
2. More availability of broadband Internet service for libraries
3. Proliferation of databases each with their own searching requirements

DEFINITIONS

Unfortunately, there is not a single definition for "discovery service," and this causes confusion. The NISO Open Discovery Initiative includes a definition which may begin to provide some clarity:

These services use an aggregated central index to enable searching across a wide range of library related resources—both licensed and free—from multiple providers. They also offer more sophisticated capabilities and faster performance than those provided by systems relying on federated search technologies.

(Open Discovery Initiative 2014)

A simplified set of definitions will do to introduce the concept of discovery to persons unfamiliar with discovery services:

For patrons: Google-like search experience for all library resources.

For librarians: A web-scale, index-based search service that includes local and remote library resources, including full-text article-level content as well as delivery of physical resources.

A discovery service should include the ability to search as many library resources as possible, making it as easy as possible to identify and retrieve relevant material. This is a change for many librarians who are used to thinking of the local collections as separate from those that are not in-house. This type of service breaks down the silos and makes this a unified experience, allowing patrons to see everything a library has to offer at once.

CURRENT STATE OF DISCOVERY SERVICES

The basics of discovery as defined above are available now. However, in order to make this technology work to its potential, a few things are still needed:

- Best practices. In June 2014, NISO released *Open Discovery Initiative: Promoting Transparency in Discovery*, NISO RP-19-2014. This is a NISO Recommended Practice document presenting best practices for content providers and for discovery service providers. As these best practices are adopted, it will be easier for librarians to compare services, as well as identify those that would be the most beneficial for their patrons.
- Communication between the discovery service and the content provider. Configuring content for a specific discovery service is not an easy task and requires content and discovery vendors to work together. This can be difficult as sometimes the vendors are rivals in this or other areas
- Stability. Librarians are starting to see this functionality as one that will be important to their patrons; however, until the first two items are dealt with, many will stay on the sideline, not having the resources to make the service work well.

ADVANTAGES

Why do librarians consider a discovery service? Primarily, because they want to leverage their existing resources. Libraries spend money on collections, databases, and other materials so they can be used. When they are difficult to find or use, the organization is not getting as much out of that investment as it could be.

Discovery services provide a single interface for searching multiple resources, e.g., integrated library systems (ILS) and databases. It provides a clear starting place for research. Learning a single interface is much easier for both librarians and patrons than learning a separate interface for each resource. Because it is easier for librarians to instruct patrons in its use, staff have more time for reference interviews, discussion and evaluation of patrons' results. It is also more likely that the single interface will be used more effectively, as it will be used more frequently.

Discovery services present a more effective alternative to both Internet search engines and federated search tools. The set of resources presented to the patron by a discovery service should be more specific to his/her needs than those found using an Internet search engine, as library resources are vetted by the library. The discovery service places the full resources of the library in front of the patron.

Discovery services, which search local indexes, return results more quickly than federated tools, which search databases remotely. Patrons using discovery services do not have to contact a remote server until they want to see the resource itself.

Because discovery services allow library patrons to simultaneously search full-text e-content and library catalogs, patrons can see and evaluate resources that are available to them immediately as well as those that will take more time to access or acquire.

DISADVANTAGES

The annual cost of a discovery service is assumed; however, there are other, more hidden costs. Some of these include staff time to:

- 1) Map data elements of the databases
- 2) Understand how the service defines terms like “relevancy”
- 3) Develop effective teaching and marketing strategies

Patrons have an expectation that everything is available when using a single search box. There are some databases or types of data that do not work well or do not make sense to include in a discovery environment. Examples are included in the section “Limitations of a Discovery Service” found below. Ultimately, there may be specific resources that must be searched outside the discovery service.

Integrating records from your Integrated Library System (ILS) into a discovery service may be challenging. Discovery services were created primarily to bring together full-text and other electronic data. Records from an ILS are quite different and may require more time to tweak. Crosswalks are usually available, but depending on your data, they may require some fine tuning as well.

LIMITATIONS OF A DISCOVERY SERVICE

There are still issues with the available discovery services. Some of these limitations include:

- Completeness. Not all resources work well in a discovery service.
 - Abstracting and indexing services often come from disciplines with specific vocabularies that provide great value to the discovery process. (Breeding 2014, January 14) These sources are best searched using their native interfaces. Some examples are WestLaw and LexisNexis for lawyers and CINAHL for nurses. These are very precise professions that require precise searching capabilities.
 - Other databases may be difficult to integrate into a discovery service because of their unique content. Two examples include HeritageQuest (genealogical resources) and Learning Express (career resources, tests, and tutorials).
 - Because of the difference in the type and breadth of metadata, some would argue that ILS data should not be part of a discovery service. MARC records provide subjects and sometimes tables of contents and summaries. Metadata is much deeper for electronic materials which can include abstracts, thesaurus terms, descriptions, and full text.

- Other resources may not be part of the discovery vendor's index because the discovery vendor has not yet implemented the database, or because the database vendor will not allow it to be implemented. If a resource is not part of a discovery vendor's index, it may be accessible via Z39.50, e.g., a federated search.
- Relevancy Ranking. It is difficult to perfect relevancy searching when the metadata is coming from many disparate sources.
 - The fullness of the metadata provided in the records being searched affects relevancy. The more full-text databases or enhanced metadata a library obtains, the better the results for patrons.
 - Known item searching is usually weak in discovery services. Items that should be at the top of a result list often are not.
- Speed. Most, if not all, discovery services are cloud-based. How quickly the results display depends primarily upon the speed of the Internet connection from beginning to end. Reasons that a discovery service performance may be slower than anticipated include:
 - The servers used by the discovery vendor are undersized or inundated by the number of patrons.
 - The bandwidth on the vendor's side or on the library's side is too low or inundated by the number of patrons.
 - Results from Z39.50 resources may be slower to display than those from a vendor's index.
 - Search results display quickly, but the full-text may be slower to display because the file is being retrieved from the original server, not the discovery vendor's.
 - The full-text being displayed could be a very large file and might take time to download and display.

AREAS OF THE LIBRARY MOST IMPACTED BY IMPLEMENTING A DISCOVERY SERVICE

- Library staff who have responsibility for the library's website will be involved in integrating the discovery service into the website.
- Librarians who deal with e-resources will be involved in culling through databases provided by the discovery vendors in the central index. In addition, they may be needed when adding other resources the library owns or subscribes to and in helping to configure link resolution.
- Reference staff may be involved in configuration discussions.
- Cataloging and metadata staff are needed to ensure that metadata and holdings are accurate and current.
- Librarians who provide bibliographic instruction will update their materials and change the way they teach, motivating patrons to use a single search box. Instead of teaching multiple interfaces, librarians can spend more time discussing the evaluation of resources.

- Interlibrary loan librarians should consider their workflow and processes, as implementing a discovery service may increase use of the collection and, if enabled in the discovery service, of the ILL service as well.

WHAT TO LOOK FOR IN A DISCOVERY SERVICE

A checklist version of this section can be found in Appendix B.

- Usage Statistics Functionality. Usage statistics should minimally include the total number of searches, result clicks, total number of click-throughs, total number of searches per month, total number of unique visitors per month, total number of click-throughs per month, top 500 search queries for the last period, and the top 100 referring URLs to the discovery service for the last period. (Open Discovery Initiative, p.27-29)
- Relevancy Ranking Practices.
 - How relevancy is determined and if it can be modified by the library.
 - Ranking of search results should be objective. This is a particular concern if the vendor provides both content and a discovery service.
 - If specific providers or types of documents can be privileged; that is, can certain providers or types of materials display before the rest of the results? Options could include displaying the library's holdings or full-text materials first.
 - Does the relevancy ranking provide results helpful for your patrons?
- Central index.
 - Which databases are available in the central index?
 - What is the quality of the metadata?
 - Does it include the types of materials you need, e.g., full-text, citations, journal backfiles?
 - Is the full-text searchable?
- Discovery layer.
 - Does it include advanced searching options, facets, and limiters? Are they easy to understand and use?
 - Does it include end-user features helpful for your patrons, e.g., lists, tagging, citation export, and social media integration?
 - Can you customize the look and feel or branding of the website? Are widgets and APIs available?
 - Can results be enhanced with cover art, recommendation engines, or other external information?
 - How usable is the site for patrons?

(Hoeppner 2012)

BEST PRACTICES FOR IMPLEMENTING A DISCOVERY SERVICE

When implementing a discovery service, most libraries will move through the following steps:

1. Identifying target audience(s).
2. Building central index. The central index should include databases of interest to your target audience(s). Not all databases provided by the discovery vendor need be included in your library's central index.
3. Authenticating patrons and resources. Not all discovery services work with all authentication options. Libraries may not have a choice in the type of authentication they must use. Setting up authentication can be difficult and time-consuming.
4. Customizing the service, including branding. Part of customizing the service includes mapping data. Because mapping ILS data is often a difficult task, be sure to include those that understand the catalog and how its fields have been used over time in this discussion.
5. Designing default presentation of search box. Lowin, Sierra, and Boyer (2013) suggested a number of items to consider when providing a single search box, as is done in discovery:
 - Think carefully about how you present this search box in context with your other services. In particular, consider how to deal with services that overlap in functionality, e.g., discovery service, ILS, specialized databases.
 - Will this be a primary or a secondary search tool? A discovery search box which patrons use, assuming they are searching the website or just the ILS, can become an obstacle. Use multiple search boxes or tabbed search boxes to direct patrons to appropriate search tools.
 - Search results from a discovery search must not only provide results, but also differentiate among the types or formats of resources.
 - A discovery search box should be centrally located and given increased screen real estate. The search box should use tabs rather than drop-down menus
6. Refining search and retrieval options. Make decisions such as:
 - Will you display your ILS records first, before other resources in search result sets? This would allow patrons to see what is held in your collections before looking at other databases.
 - How will you take patrons seamlessly from search to fulfillment? When thinking of discovery services, most people consider the viewing or downloading of full-text as fulfillment. However, the service may extend to any material available through the discovery service, even materials available at other libraries.
7. Testing usability.
8. Enhancing the tool.
 - Make search boxes portable so they can be presented within other services like Blackboard or LibGuides.

- Provide instruction. Although using a single search box may seem simple to use, instruction and documentation are needed for patrons to understand the scope of the search results and the access options for different materials.
- Allow the integration of popular bibliography management tools like RefWords and Zotero.
- Create subject guides to supplement the discovery service. Particularly for research that may want highly specific information, the discovery service may provide results that are too broad. Providing subject guides can aid those patrons in finding the resources they need.

(Thompson 2013)

Do not underestimate the time necessary to customize the service (#4) and refine the search options (#6).

EVALUATING YOUR DISCOVERY SERVICE

A checklist version of this section can be found in Appendix C.

Once the institution has made the decision to implement a discovery service, it is important to work with the selected vendor and key project stakeholder to identify and troubleshoot the efficiency of the new system. This is the time to evaluate decisions made during the implementation process and utilize patron feedback to inform and ameliorate future workflows. It is important to analyze the goals of implementing a discovery service and determine how they align in practice. Did you want to give primacy to your local collections, have your patrons discover more relevant material, or make the user experience with library resources easier?

Evaluation also includes recognizing how your new discovery system covers resources and indexes them, what you can learn from usage statistics and relevancy rankings, and how your selected vendor interacts with you on an on-going basis.

VENDOR COMPANY

Understand the contractual agreements between you and the vendor. Understand the type of support you will receive from the vendor as part of your agreement and begin to evaluate that experience. Areas to focus on include company stability, quality of their staff, your experience during support interactions (outside the implementation process), quality of help they make available, and the process through which they handle conflict. Be aware of how they handle system updates and technical support.

RESOURCE COVERAGE AND INDEXING

Since there are currently no standardized tools to adequately measure how much of subscription content is covered by a given central index, it becomes imperative to measure resource usage against what the vendor advertises. It is important to work alongside your vendor to understand what items are discoverable and perform searches that cover full text, subject headings, and abstracts. In "Paths of Discovery," Asher, Duke and Wilson, discovered that students were unable to evaluate sources on their

own and fully depended on default search settings. This is all the more reason to work with your discovery vendor to establish usable search default settings for your institution. (Asher et al 2012)

USAGE STATISTICS

All the major discovery vendors provide usage statistics to their subscribing institutions. It is critical to understand through this data which portion of library resources your patrons are finding through the discovery service, and what type of information they are accessing through other resources such as Google Scholar.

RELEVANCE RANKINGS

Relevance ranking is another critical test of your discovery service. Librarians need to know which resources are rising to the top of their search results for given searches. Many vendors will not share their search algorithm with their subscribing institutions. As such, it is very important to run searches to discover if the vendor's own data will appear at the top of the search results first or a combination of sources. EBSCO is one of the discovery vendors that provides detail on their website regarding their method for ranking search results.

TESTING

Once you have established criteria to evaluate the discovery service, you must identify the resources and tools through which you will gather testing data. Some institutions rely solely on quantitative or qualitative research methodologies; others use mixed methods. Whichever you select, you must adhere to proper research protocols. It is important to build your network of resources, e.g., other colleagues who are using the same system, and solicit their advice when building test scenarios. Maintain a working relationship with your subscription vendor and utilize their help in connecting you to other sources in your region.

Apart from relying on your colleague network, begin to build your own scenarios based on patron feedback. Build survey forms that display after patron search sessions, and follow-up with patrons via telephone or face-to-face interviews to capture the user experience. Rely on focus group feedback to determine enhancements to the services.

One test scenario might be to evaluate resource discovery with and without the use of subject guides. Divide your focus group into two teams, with one team relying only on default discovery settings, and the other team adding subject guides. Note the differences and compose your report.

TRENDS

Once your testing has been completed in-house, be aware of new developments or enhancements to your system. Begin to collect information from the vendor, e.g., technical information, case studies from other institutions with the same patron demographic. Attend seminars, conferences or other on-going focus group meetings; and participate in focus groups that seek to improve your system's operations.

CONCLUSION

Discovery services continue to undergo changes, working toward Google-like simplicity, but with library-specific functionality. Activities like NISO's *Open Discovery Initiative (ODI)* and on-going discussions via email discussion lists, webinars and conferences serve to increase awareness of this type of service, as well as provide a platform for sharing experiences. In addition, the *ODI* ". . . aims to facilitate increased transparency in the content coverage of index-based discovery services and to recommend consistent methods of content exchange or other mechanism." As vendors re-tool their services to comply with the *ODI*, it will become easier to compare and evaluate discovery services.

APPENDIX A

MAJOR VENDORS FOR DISCOVERY SERVICES

Vendors chosen for this overview had to meet these requirements:

- Can be used with a variety of integrated library systems
- Either a relatively new discovery service or one that is well-known in Texas

VENDORS

BiblioCommons

<http://www.bibliocommons.com/>

Blacklight

<http://projectblacklight.org/>

EBSCO Discovery Services

<http://www.ebscohost.com/discovery>

Ex Libris Primo

<http://www.exlibrisgroup.com/category/PrimoOverview>

Innovative Encore

<http://www.iii.com/products/encore>

OCLC WorldCat Discovery

<http://oclc.org/services/discovery.en.html>

ProQuest Summon Service

<http://www.proquest.com/products-services/The-Summon-Service.html>

SeeSearch

<http://www.seesearch.io/>

VuFind

<http://vufind.org/>

BIBLIOCOMMONS

BiblioCommons was founded in 2006 through a project that studied “the emerging technologies that teens were using to engage with popular culture” and how they “might be co-opted to establish a social context for the sometimes isolating activity of reading.” (BiblioCommons 2013).

This discovery service focuses exclusively on public libraries, their public catalogs and typical catalog functionality. Their research has found that public library patrons have difficulty navigating result sets that include both catalog and database materials. As a result, they do not intermingle these results, but separate them in one of three ways:

- Catalog results from a keyword search would display in the main body of the web page. A left column titled “Explore Further” would display results from online or e-book resources.
- When using BiblioCommons to integrate the catalog and a library website, it creates a “Research” or “Databases” tab in the main navigation. This tab could provide access to specific topics or databases.
- Patrons can choose to search the catalog, the website, or databases/articles by using radio buttons under a simple search box.

Because catalog and database results are separated, federated databases can be included as separate options in any of the three options above. BiblioCommons can integrate with databases and digital collections that support SRU and/or either Dublin Core or MARCXML record schemas.

Authentication options include username or barcode and PIN.

The basic functionality of this system is that of an ILS, therefore other types of data, like journal articles, will require mapping. Results, whether citation or full-text, from other databases will display within the original interface, e.g., articles from EBSCOhost will display within their website. For e-books, they currently have a browser-based platform for reading, in beta (BiblioDigital), and integrate with OverDrive, 3M Cloud, and Axis 360.

Their central index includes the data only within the library’s ILS. All other resources must be purchased or subscribed to by the library.

Minimally, BiblioCommons works with the following ILS systems: Symphony, Polaris, Horizon, Sierra, Millennium, VTLS, Carl-X, and Evergreen.

BiblioCommons’ relevancy ranking is the result of ongoing keyword analysis, as well as incorporating various circulation metrics to automatically adjust to an individual library’s holdings and circulation patterns. Relevance criteria include:

- Overall circulation metrics and holdings across all BiblioCommons libraries
- Ongoing keyword analysis of patron search behavior

- Individual library's holdings and circulation patterns, ensuring that what is relevant to the community (based on metrics such as the number of titles, number of holds) is reflected in the search results

Library staff can run reports on BiblioCommons activity, including:

- Type and quantity of user-generated content (reviews, ratings, lists, etc.)
- Patrons who contribute ratings, reviews, lists and other content in high quantity or with high quality
- Patron feedback

Each library is provided with a Google Analytics account for the library's BiblioCore catalog in order to track statistics, search patterns, and other usage metrics.

BiblioCommons is a multi-tenant software service. That is, it is a cloud service with a single instance of the software that serves multiple libraries. As a result, their focus is on providing configuration options within the software, not customization of the software.

BiblioCommons can replicate the library's header (logo, colors, and fonts) as well as full navigation. For consortia, BiblioCommons can use the consortium header and navigation or customize per library. For more customization, BiblioCMS can be used, which is a platform with tools needed to build and manage a website, e.g., widgets, staff blogs, visual branch location, event promotion.

Patrons and staff can share and promote titles through Twitter, Facebook, and other social network sites. Patrons can also review and rate items. These can be viewed for all users of BiblioCore system (catalog), not just the local users.

BiblioCore (catalog) pricing is based on the library's legal service area; BiblioCommons pricing is sold based on flat formulas. In addition, there is a one-time implementation fee.

Current development includes:

- BiblioDigital, an integrated platform for reading, borrowing, and purchasing e-books (currently in beta).
- FRBR-style search results, which will display differing formats beneath a single title.
- Responsive design, which will allow patrons have full functionality on any device
- Catalog re-design, which will provide a more modern interface for the software.

Libraries using BiblioCommons in the Southwest include:

- Austin Public Library: <http://austin.bibliocommons.com/>
- Daniel Boone Regional Library: <http://dbrl.bibliocommons.com/>
- Tulsa City County Library: <http://tccl.bibliocommons.com/>
- Pueblo City County Library: <http://pueblolibrary.bibliocommons.com/>
- Omaha Public Library: <http://omaha.bibliocommons.com/>

Comments from libraries that use BiblioCommons:

- What do you like the best about BiblioCommons?
 - Their Partner Portal has resources for known errors, what they are working on, and how features are used.
 - Their forum for feedback allows me to see that status of issues without contacting their staff.
 - They now have regular newsletters and webinars.
 - Patron like the filters (fiction vs non-fiction), lists, book shelves and being able to maintain their own reading history through the book shelves.
 - Patrons can create a login and password instead of remembering their barcode number and can reset their PIN/password themselves.
 - Patrons can set up to 3 preferred pickup locations.
- What do you like the least about BiblioCommons?
 - To change the mapping of an ILS to BiblioCommons requires the library to make a request of the company.
 - They are inconsistent in determining timeframe for closing support tickets, e.g., simple tickets may take a few hours or a few months
 - Navigation is restrictive, e.g., must have My[library] and Explore links in header, so we cannot make BiblioCommons consistent with library website. Instead, we made our website consistent with BiblioCommons.
 - Patrons often see BiblioCommons as the library's website, and do not explore the website itself.
 - Another login and password makes the experience more complicated. Patrons are forced to register and create a login.
 - Patrons cannot see whether or not they will be able to renew an item.

BLACKLIGHT

Blacklight is an open source Ruby on Rails Engine plugin that provides a discovery interface for Solr indexes. Blacklight provides a default user interface which is customizable via the standard Rails (templating) mechanisms. Blacklight accommodates heterogeneous data, allowing different information displays for different types of objects.

Initial development was geared toward academic libraries, and deals with library data in MARC format. However, it is not limited to working with just MARC, but accommodates heterogeneous data and allows different information displays for different types of objects.

The primary functionality for Blacklight includes:

- Stable URLs for search and record pages allow patrons to bookmark, share, and save search queries for later access.
- RSS and Atom responses of search results.
- For certain types of solr documents, an OpenURL/Z39.88 COinS object is embedded in each document. This allows plugins like Zotero to extract data from the page.
- Support for OpenSearch, a collection of simple formats for the sharing of search results.
- Relevance-based searching with the ability to locally control the relevancy algorithms.
- Facets.
- Search queries targeted at specific sets of fields.
- Results sorting.
- Bookmarkable items.
- Permanent URLs for every item.
- Tools for exporting records to RefWorks or Endnote, sending records via email or SMS, or as a formatted citation.
- User tagging of items.

Blacklight does not:

- Have a central index.
- Require patron authentication; but if needed, can work with most providers.
- Provide statistics natively, but can work with web-based providers like Google Analytics.

There are technical requirements for implementing Blacklight:

- Ruby 1.9 or greater
- Rails 3.2
- Java 1.7 or greater
- Apache Solr
- Cascading Style Sheets

- HTML

As it is open source, the library can modify branding and functionality to fit its needs.

Relevancy can be modified by the library and is created by defining a multi-layered sort, e.g., sorting results first by the score field, then by the publication date, then by the title.

Although not part of the software, social media can be integrated using plugins such as AddThis. Tagging, reviewing, and rating items is not available in the software.

Current development focuses on:

- Statistics gathering
- Adding autocomplete functionality to the search form
- User interface enhancements
- Dropping support for older versions of Ruby and Rails

No libraries in Texas have been found to have implemented Blacklight; however, below are several outside the state:

- Columbia University Libraries: <http://clio.columbia.edu/>
- Indiana University - <http://iucats.iu.edu/>
- Johns Hopkins: <https://catalyst.library.jhu.edu/>
- New York Public Library, Andre Studios: <http://andrestudios.nypl.org>
- Stanford University: <http://searchworks.stanford.edu/>

EBSCO DISCOVERY SERVICES

EBSCO Discovery Services, or EDS, entered the discovery tool landscape in 2010 as a response to Google search with the promise of better search results and user experience. According to EBSCO, a discovery services platform should comprise the library's entire collection (both print and digital); a robust architecture for indexing, configuration and customization; an integrated suite of discovery and management applications; flexible presentation options; and support for interoperability with the library's preferred ILS. This platform should be fully interoperable with other library services, placing the end-user experience at the center of the library's technology ecosystem.

EDS supports integrated searching of content from full-text databases, citation databases, and local content collections such library catalogs, institutional repositories, open access resources and digitized collections. They compile and index metadata and full text from a variety of content sources into a unified, pre-indexed search platform on EBSCO servers.

EDS works with major integrated library systems (ILS), and EBSCO is actively pursuing partnerships with others as their focus is to have a discovery tool "which works seamlessly in as many library environments as possible, regardless of which ILS or next generation library services platform a customer has chosen." (Kelly 2013, p.36) By partnering with ILS vendors, EDS provides choices for libraries, because they can decide which interface to use, either the ILS or EDS platform, and also get more catalog functionality, such as view book availability and book checkouts. According to their website, EDS has partnered with these major ILS vendors: OCLC, SirsiDynix, and Innovative Interfaces (III).

Publisher agreements vary in terms of the metadata included, but EBSCO has relationships with partners where rich metadata is provided (e.g., author-supplied abstracts, author-supplied keywords, author affiliations, etc.). To this, EBSCO adds value through subject headings, and other key elements for applicable records.

The EDS index represents content from approximately 23,000 providers, which accounts for more than 1,000,000 publications. EBSCO also licenses full text from over 16,000 publishers.

EDS provides indexing and access to subject indexes, such as Art Abstracts, CINAHL, Historical Abstracts, Inspec, MEDLINE, and PsycInfo. For libraries that subscribe to the EBSCOHost platform, those databases become part of EDS.

Libraries can choose not to display databases. This is managed through the administrative interface, EBSCOadmin. Using *Full Text Finder*, EBSCO's publication finder, link resolver and holdings management tool, it is possible to exclude holdings by vendor/journal.

If a library would like to include content that is not natively searchable in EDS, it can supported through the creation of apps, widgets, plug-ins and extensions.

EDS libraries can brand the interface with logos, preferred colors, images and custom messages. Many libraries have created a fully-branded EDS profile that provides a seamless experience, making it feel like an extension of the library website. The top and bottom of all pages can include text, images, or custom HTML code displaying links to other points of interest to users. Logos can link to the library's website as well. Libraries can use HTML, JavaScript and CSS in various places within the EDS user interface to further enhance the user experience.

Patrons can copy and paste citations in the following formats:

- ABNT (Brasil)
- American Medical Association (AMA)
- American Psychological Association (APA)
- Chicago/Turabian: Author-Date
- Chicago/Turabian: Humanities
- Harvard
- Harvard Australian
- Modern Language Association (MLA)
- Vancouver/ICMJE

Patrons can export citations in the following formats:

- Direct export in RIS Format (e.g. CITAVI, EasyBib, EndNote, ProCite, Reference Manager, Zotero)
- Direct export to EasyBib
- Direct export to RefWorks
- Direct export to EndNote Web
- Generic bibliographic management software
- Citations in XML format
- Citations in BibTeX format
- Citations in MARC21 format

Patrons can email citations in the following formats:

- RIS Format (e.g. CITAVI, EasyBib, EndNote, ProCite, Reference Manager, Zotero)
- Generic bibliographic management software format
- Citations in XML format
- Citations in BibTeX format
- Citations in MARC21 format

EBSCO's relevancy ranking utilizes numerous criteria, including term frequency, field weighting, exact title matching, and content attribute boosting. The major contributing factor in relevance scoring is the frequency of the user's search terms in matching EDS metadata and full-text records. For detailed information on how relevance is determined in EDS, see http://support.epnet.com/knowledge_base/detail.php?id=3971.

Each EDS library has influence over the relevance ranking of its EDS integrated local catalog and institutional repository. For example, library catalog records can be configured to appear higher (or lower) in the search results list relative to other content

in the EDS profile. This setting is configured in the EBSCOadmin application. Please note that this ability to adjust the relevance ranking of a local content collection applies to all records in the collection, and cannot be configured at the individual record level.

The relevance ranking of EDS content beyond catalogs and institutional repositories cannot be adjusted by the library. The EDS Central Index is tuned for optimal relevance ranking across a breadth of content types. Content indexed in EDS ranges from records with very “thin” metadata (e.g., news articles), to records with rich metadata (e.g., articles with detailed indexing and abstracts), to complete e-books with hundreds of pages of text.

Patrons can set up their own search parameters limiting searches both in time and scope. An important finding in the Bucknell study was the patron’s over reliance on the discovery algorithm. Most of the students in this study did not search beyond the first page of results. (Asher et al; p.474)

Patrons can:

- Add searches or individual records to various social networking sites such as Facebook, Pinterest, Twitter
- Use permalinks, which are provided for all search results and detailed article records
- Subscribe to RSS Feeds
- Save, tag and share search results lists
- Print, email, save, cite, export, create notes, and bookmark

Libraries can customize EDS in a number of ways:

- Name of the service
- Various branding sections on both search screens, results and other pages
- Tool bar links (both labels and link destinations)
- Color combinations of the interface
- Labeling and ordering of various components such as facets on the result pages
- Global defaults for search modes utilized, Basic vs. Advanced search pages, limiters applied
- Options for various profiles (more than a single iteration of EDS) to address more granular needs such as dedicated discovery experience for a given subject area (e.g. business)
- Options for "widgets" on result pages and detailed record pages
- Custom mapping of metadata

EDS functions can be integrated into a library’s website and the EDS API allows for integration into a library’s ILS.

EBSCO supports the final recommendations of the Open Discovery Initiative (ODI) working group for best practices for discovery services. EBSCO participated in the ODI Committee and the resulting recommendations are in line with EBSCO’s open policies around metadata sharing and vendor cooperation.

Statistical reports include reports include: Session Usage, Database Usage, Title Usage, IP Address Usage, Interface Usage, Session by Hour, Link Activity Reports, COUNTER Reports, and Personalization Activity Reports.

Authentication options include:

- IP Address
- Patterned IDs
- Patron ID Files
- Referring URL
- User ID and Password
- Cookie Authentication
- Athens Authentication
- Shibboleth Authentication
- HTTPS Authentication
- Personal User Authentication
- Geolocation

Current development includes:

- Anticipating user intent—this could include the refinement of EDS features already in use such as Research Starters, journal/magazine placards and widgets. Widgets can be used for everything from incorporating highly-specialized research resources into the search experience to posting library hours, the weather or the local news.
- Increasing importance of “open” knowledge base integration, holdings and link management.
- Using APIs to better facilitate and openly integrate with a variety of ILS systems and other library systems.
- Refining of search engines that leverage subject indexing, and integrate the most respected thesauri via concept mappings.
- Integrating references, alt metrics, and other scholarly metrics into all of the above.

Many libraries in Texas have implemented EDS; below are several examples:

- Abilene Public Library: <http://www.abilenetx.com/apl/>
- Arlington Public Library: <http://www.arlingtonlibrary.org/>
- Hardin-Simmons University: <http://www.hsutx.edu/library/>
- Houston Baptist University: <http://www.hbu.edu/About-HBU/The-Campus/Facilities/Moody-Library.aspx>
- Lee College: <http://www.lee.edu/library/>
- Texas A&M (College Station, Texarkana, Kingsville, Corpus Christi, Commerce, Central Texas): <http://library.tamu.edu/>
- Texas Tech University: <http://library.ttu.edu/>
- Texas State University: <http://www.library.txstate.edu/>

Comments from libraries that use EDS:

- What do you like the best about EDS?
 - EDS links easily to EBSCO content.
 - It provides guest access which allows access to freely-available materials.
 - It is vendor neutral. EBSCO resources do not rise to the top of search results; our library holdings do. It does not prefer EBSCO materials over other provider's materials.
 - Because of the single search box, a patron will get "something," no matter what they type.
 - The EBSCO interface is familiar and easy to use.
 - There are many customization options for the interface and for behavior of the system.
 - EBSCO continually develops and improves the service.
 - The biggest advantage to us for EDS over other discovery vendors is that since we have access to a significant portion of our online fulltext content through Texshare or individual subscriptions from EBSCO, links to access content does not require additional steps using an OpenURL server.
- What do you like the least about EDS?
 - EBSCO highlights its own product, e.g., their materials rise to the top of search results. It is difficult to find a way to bring our library's materials to the top. It does not seem content neutral, at least we could not figure out how to make it so.
 - It is difficult to isolate books, especially physical books, using OneSearch.
 - When you call support, you work with nice people, but they do not necessarily understand libraries and do not always have the skills you need. It makes the discussion difficult.
 - We hear about new functionality, but sometimes it doesn't appear.
 - For federated searching, we pay for each connector separately.
 - The administrative interface is not intuitive and need re-organizing. In one case, the same phrase – Create custom link – is used in two places and has two meanings.
 - For discipline-specific searching, EBSCO determines which databases are searched, and not the library.
 - Statistics are difficult to unravel.
 - EDS is not a public library-friendly product; it is an academic product. EBSCO is working on this.
 - Finding what is "peer-reviewed" is difficult, as the phrase means something different across databases.
 - You cannot filter by "article" before you run the search; filtering is done after the initial search.

- You can use other link resolvers, but they ultimately have to be translated into EBSCO's version; this can cause issues.
- Federated searching usually times out, making those databases less effective.
- Many customization options require scripting or intermediate HTML skills, so many librarians cannot implement them.

EX LIBRIS PRIMO

Similar to EDS, Primo was first launched in 2010. This discovery service revolves around the following key principles:

- Quick delivery of the most relevant results
- Serendipitous discovery through navigation trails and browsing
- Human learning through a discovery process
- Search results tailored to a user's profile and preferences

Primo can index local online catalogs using pre-configured templates for harvesting, and provides the library the ability to modify, extend or add new templates. Each library can utilize default rules or customize the metadata mapping and normalization rules for each data source.

Institutional repositories, digital collections, journal articles (both fulltext and citations), A&I databases, research data sets, open access collections (and the open access portion of hybrid collections) as well as formats like e-books, e-journals, audio, video, reviews, legal documents can be included.

As part of the Primo implementation, the library catalog is indexed and the library has access to the central index, which includes scholarly resources of global and regional importance, encompassing journal articles, e-books, audio, video, reviews, and legal documents.

Libraries can choose which collections in the central index to activate for discovery. Options include, but are not limited to, the following:

- User interface look and feel, including the logo, home page, CSS (fonts, colors, display, sizes, etc.), and the simple and advanced searches, i.e., what limiters and refinements will display in each
- Search tabs and scopes
- Facets, including the order of facets, number of facet values to display, sorting of the facet value, and library-created facets
- Brief results layout
- Normalization rules
- Labels

Libraries can add virtual references services, LibGuides, and shelflist maps, customize help files, embed the Primo search bar in other web pages, and search in languages other than English. There is also a Developers Network, which allows libraries and developers to share code and other content relating to Ex Libris programs and/or services.

Patrons can export citations:

- RefWorks
- EndNote Web
- del.icio.us

- RefMan
- Mendeley
- Citavie
- Zotero
- RIS format

Citation formats include:

- APA
- MLA
- Chicago/Turabian

Primo goes beyond basic ranking to take into account a user's background and information needs as well as the global scholarly significance of materials. ScholarRank™ is the technology deployed by Primo for calculating the relevance of items to a specific query and to a specific user's information need. To determine the position of an item on a result list, the Primo ScholarRank technology takes into account the following three elements:

- The degree to which the item matches the query
- A score representing the item's scholarly value (calculated from factors that are unrelated to the query such as citation counts and other usage based data)
- Information about the user and the user's research need at the specific point in time

Relevancy ranking is one of the key selling points for Primo. They partnered with a company specializing in relevance ranking algorithms and tailored Primo's algorithm to the library environment. On their website, Primo boasts a search response time for most sites below 500 milliseconds for an average search.

Facebook is integrated into Primo; social media tools are integrated using AddThis functionality. Patrons can tag, rate, and review items.

From the inception of ODI, Ex Libris has been and still is actively involved in ODI activities. They view it as a critically important basis of the library discovery ecosystem. Rachel Kessler (a Discovery and Delivery Product Manager) is a member of the ODI standing committee, and ODI activities continue to be promoted in Ex Libris communities, through IGELU, ELUNA and many other regional forums.

If a library would like to include content that is not natively searchable in Primo, Ex Libris provides a three-pronged approach:

- Outreach and collaboration: many cases of content-providers' lack of participation derive from lack of awareness or knowledge about the needs and the benefit of open library discovery. Primo uses conversation and collaborative approaches, adhering the needs of all stake holders, to try to get the support of content providers.

- Alternative coverage: Many content packages contain duplicate coverage. Ex Libris helps libraries identify opportunities for alternative coverage when certain content which they subscribe to isn't yet available for open discovery.
- Alternative discovery: Primo includes tools including external-search adaptor (also known as third-node adapter), adwords and zero-results tile to facilitate navigation to databases not indexed in the central index.

Out-of-the-box statistical reports, including click reports and search statistics, are available to libraries. A new statistical service is currently being implemented. Based on the Oracle Business Intelligence platform, libraries will be able to create their own reports and share report templates with others.

Primo supports the option to authenticate users via Active Directory and LDAP. It also has integration interfaces to existing proxy servers such as EZProxy. Shibboleth is supported, if the institution's Shibboleth implementation uses SAML 2.0.

Current development includes:

- New user Interface: fully responsive and integrating discovery workflows and concepts using state of the art technologies
- Enhanced personalization option: currently, the personalized ranking feature is on the results page; will continue to add more improvements and parameters for users to configure as part of their individual and persistent personalized ranking.
- Ranking algorithm enhancements: allowing a greater mix of results and to continue to improve known items, broad topic and other types of searches
- Digital collections: ease of navigation for digital collections as part of Primo for several and selected digital repositories
- Analytics: enhancements in Primo Analytics that will also allow cross analytics with the Ex Libris unified resource management solution Alma

Several libraries in Texas use Primo as their discovery tool; examples include:

- Midwestern State University: http://primo-pmtnao1.hosted.exlibrisgroup.com/primo_library/libweb/action/search.do?vid=MWSUALMA
- The University of Texas at Dallas: <https://www.utdallas.edu/library/>
- Texas Woman's University: <http://www.twu.edu/library/>

Comments from libraries that use Primo:

- What do you like the best about Primo?
 - If you get into the habit of using the menus, you can refine or limit searches well.
 - Ex Libris is very customer-driven. While some issues take a while to fix, they are attentive, their customer service is good, and their team is expanding.

- The service is hosted by Ex Libris, so there are no local servers to be maintained.
 - Primo works well with broad, general searches.
 - Libraries have the option of being on the Direct program, which gives them access to some of the back-end functionality, or being on the Total Care program, in which Ex Libris takes care of everything.
- What do you like the least about Primo?
 - The interface is confusing.
 - It is difficult to get to the articles within databases.
 - It does not work well with EBSCO resources.
 - Support for Primo is not as good as support for Alma. They are not as fast, have fewer people available, and are not as communicative.
 - There currently is no A-Z list for Primo; it is on their roadmap.

INNOVATIVE ENCORE

Innovative Interfaces did not respond for the 2015 report; information provided is from 2014.

Encore is an Innovative Interfaces product and was first released in 2010 alongside Primo from Ex Libris and EDS from EBSCO. Unlike EDS and Primo, Encore does not have a pre-harvested index of content. Instead, article content is pulled for Encore search results in real-time using web services. (Rowe 2011, p.12) More recently, Encore has partnered with EBSCO to provide patrons with a broad collection of full-text articles, and an index which spans thousands of participating publishers and partner resources.

Results from Encore can include items from local collections, articles, eResources, eBooks, print materials, harvested digital collections and institutional repositories.

Encore also partners with Overdrive and 3M, allowing e-book integration and making the user experience seamless in terms of discovering both print and electronic items and showing real-time availability. Patrons can initiate e-book checkouts and holds for 3M materials from the Encore interface and view the status of these materials in their own browse and Encore account view.

Another partnership which enhances the user experience is through ChiliFresh, which encourages social interaction between the patrons and the library through a database of trusted ratings and reviews written by library patrons.

Encore Duet is a partnership between Innovative and EBSCO which integrates articles with results from your library. Users are presented with a single, unified set of facets, including EDS source-types that let users filter to academic journals alongside books or government publications.

Some of the key features of Encore are single search results; integration of articles, books, e-books and digital collections; real-time ILS/LSP integration; and 3M Cloud Library, ChiliFresh, and Overdrive accessibility.

Encore can work with ILS products other than Millennium, which is developed and supported by Innovative. The interface can be customized by customers, in a manner similar to EDS and Primo.

These libraries use Encore with Innovative's ILS:

- University of Texas of the Permian Basin: <http://library.utpb.edu/>
- University of Texas at El Paso: <http://libraryweb.utep.edu/>

Comments from libraries that use Encore:

- What do you like the best about Encore?
 - It came to the library fully-formed and we did not have to edit any web pages.
 - Easy to use.
 - Facets make limiting easy.

- Its look and feel were familiar to users because it mimicked Google.
 - The interface is the same as their ILS (Sierra).
 - No download, upload, or export of the catalog is necessary.
 - It connects deeply into the Sierra ILS.
- What do you like the least about Encore?
 - It lacks phrase searching. All searches are keyword-type searches.
 - It does not work with Shibboleth or LDAP authentication options.
 - You cannot dynamically insert a proxy string or pass an institutional identifier.
 - It does not do obscure Boolean searching as well as it does the more general searching.
 - Customer service is on west coast time and is not available when we open our library. It can take 48 hours to get back to us.

OCLC WORLD CAT DISCOVERY

OCLC's WorldCat Discovery made its debut in early 2014 and will replace the OCLC FirstSearch and WorldCat Local services. OCLC FirstSearch is OCLC's online reference service, available since 1991, that currently provides searching of WorldCat and several additional databases. WorldCat Local, released in 2008, was OCLC's first discovery service.

During the transition from FirstSearch and WorldCat Local to WorldCat Discovery, subscribers to the services being replaced receive access to WorldCat Discovery in addition to their existing service, so they can become familiar with the new service before transitioning all use to it in late 2016.

Through the contract between the Texas State Library & Archives Commission and OCLC, TexShare libraries, both public and academic, who participate in the database program can access FirstSearch, and now Discovery, at no additional charge.

A "discovery service" enables information seekers to find needed resources in all the collections a library makes available in a single search. Components should include:

- Central index of normalized metadata
- Interface layer that combines results from all types of formats into a single relevancy-ranked results set
- Search capabilities that include facets and the ability to iteratively refine
- Single search box user experience

The central index contains e-content collections, open access collections, library catalogs, institutional repositories, and digitized collections. Libraries have access to:

- 339 + million bibliographic records in the WorldCat database
- 200 million + article-level records from ArticleFirst, MEDLINE, ERIC and other sources made available freely worldwide
- More than 1.4 billion article citations from licensed content providers and open access collections

Currently, major formats included are:

- 315 million books
- 16 million e-books
- 12 million serial titles
- 20 million sound recordings
- 13 million visual materials
- 43 million digital items
- 4 million maps
- 7 million musical scores

Discovery provides access to both citation-based and full-text materials, as well as open access and public domain material, including HathiTrust, the Public Library of Science (PLOS), the Internet Archive, Project Gutenberg, PubMed, PubMed Central, and Sci

Tech Connect. Librarians may enable searching of any of the 2,100 collections in the WorldCat Discovery central index to which they subscribe that are not open access or part of WorldCat.org.

OCLC does not focus on licensing material provided to libraries, but rather partners with publishers, aggregators and societies, to receive and index their metadata into their central index. OCLC's approach to the central index is to remain vendor-neutral.

Library staff can control which e-content collections are searchable by their users. They can also choose whether to enable access to full text content.

Each WorldCat Discovery subscriber has a unique URL featuring its institution name for its WorldCat Discovery site. In addition, each subscriber can configure its site with the following:

- Library logo
- Library branding colors
- Links to library resources such as library website, virtual reference chat, other websites familiar to users
- Fulfillment options
- Branded version of the WorldCat Discovery search box for use on websites
- Customization of button text is planned as a future enhancement

A WorldCat Discovery API, now in beta, provides access for people to search and find resources in WorldCat and a central index of article and e-book metadata.

Additional Discovery configuration choices include:

- Enabling searching of WorldCat Discovery central index e-content collections to which your library subscribes
- Organizing available databases in groups to support searching by users with specific subject interests
- Adding an ILL request button to support user-initiated ILL requests
- Interoperability with a library's local catalog to display availability details for items in search results, including availability details for branch locations (additional fee)
- Use of the WorldCat knowledge base for integrated link resolution and to support an A to Z list (additional fee)
- Link to an existing knowledge base to support link resolution (additional fee)
- Remote searching of databases not included in the WorldCat Discovery central index (additional fee)
- Views of materials in library groups to which a library belongs (additional fee)

WorldCat Discovery users can cite and export records formatted for APA, Chicago and MLA in RefWorks and EndNote. Zotero is also supported. OCLC plans to add more formats as part of ongoing enhancements to the service.

Relevance in WorldCat Discovery is generally based on the following:

- The search terms in the author then title fields are weighted most heavily, followed by terms in remaining fields in the record
- Term frequency
- Proximity of the terms to one another
- Currency
- How many libraries own an item ("widely held")
- Works in the language of the user's browser are elevated in ranking.

Library staff can modify the default search order of results:

- Library and Relevance: Displays locally-owned items first in a list of relevant items; this is the default in the Discovery service.
- Relevance only: Displays results by relevance without consideration of whether an item is available locally
- Date (Oldest first)
- Date (Newest first)
- Most widely held: Sorts results according to the number of OCLC library symbols attached to each record in the WorldCat database.

Users can modify the results display:

- Library and Relevance
- Relevance only
- Date (Oldest first)
- Date (Newest first)
- Most widely held

Relevant content that is owned by a library will display in search results before items not available locally. Library staff can decide to give preference to specific providers, allowing those items to be sorted to the top of the results list.

Re-mapping of metadata is not possible within Discovery. Libraries are encouraged to update their holdings or add local holdings to WorldCat during the implementation process.

If a database is not part of the central index, OCLC has two approaches to making it available:

1. When possible, OCLC negotiates with the vendor/publisher to load the data centrally at OCLC.
2. When that is not possible, they rely on Z39.50 to search the database remotely.

OCLC provides a report of monthly usage and database details for OCLC and non-OCLC databases. Library staff can set up statistical tracking for WorldCat Discovery in their existing use of Google Analytics. For an additional fee, libraries can use Adobe® SiteCatalyst® for more customizable reporting.

Authentication for patron-initiated interlibrary loan requesting and access to restricted content such as full-text in licensed content sources is managed via IP address

recognition. Subscribers maintain their IP addresses in OCLC Service Configuration. When additional authentication is required, a library's local authentication prompt appears. Discovery works with all major authentication systems.

Social media integration is currently part of WorldCat.org, and is planned for Discovery, beginning with Facebook and Twitter. The option for patrons to add reviews is planned as a future enhancement. Incorporation of the Google Book Search API gives users access to all digitized Google books and a partnership with Goodreads provides access to their reviews in detailed record displays.

In general, OCLC agrees with the direction and spirit of the ODI and supports efforts that simplify the process of sharing metadata and that ensure fair and unbiased linking practices. OCLC will soon release its responses to the ODI vendor compliance checklist.

Current development includes:

- Add popular FirstSearch and WorldCat Local features to Discovery
- Add new e-content collections to the Discovery site index
- Customization of button text
- Continuing work on the WorldCat Discovery API
- Adding more formats for citing and export data
- Allowing patrons to add reviews
- More social media integration

Many libraries are testing the WorldCat Discovery service. Below are three that are using it with their patrons:

- Southwestern Assemblies of God: <http://www.sagu.edu/services/nelson-memorial-library>
- Texas A&M International University: <http://library.tamtu.edu/>
- University of St Thomas: http://www.stthom.edu/library_research/

Comments from libraries that use WorldCat Discovery:

- What do you like the best about WorldCat Discovery?
 - Discovery has an intuitive interface, is easy to use, and users can find options easily.
 - The initial screen is clean; options are available after you search and not before.
 - On the search results screen, you can see the list of libraries that hold that item.
 - Request for interlibrary loan is available directly from the record.
 - As it is part of TexShare, we did not have to pay for it.
 - Libraries are in control of their own catalog content. Updates display immediately.
 - Support is provided in a variety of ways, e.g., office hours for quick answers, online, email, phone, listerv, can submit feedback and can request a feature.

- Easy initial configuration.
 - Vendor-neutral
- What do you like the least about WorldCat Discovery?
 - Configuring a custom collection is not intuitive. It has improved, but librarians need training to do this.
 - Statistics that come with the service are canned and not very helpful. More extensive statistics are available for a fee, but even that does not provide everything a library might need.
 - Because of embargos, sometimes Discovery shows that the library owns an article or chapter before it has arrived.
 - It is not always evident where to click to access fulltext content.
 - FRBR integration can be an issue. It is confusing to users.
 - My List is only temporary; you cannot save records to a list and come back to them during a later session.

PROQUEST SUMMON SERVICE

According to ProQuest, for a discovery service to be successful, the library should have useful content coverage for users and should be embedded into the discovery experience, its collection should be universally explored and accessed, and its users should have an effective way to leverage the library and its resources.

The Summon index contains over 2.5 billion records representing more than 90 different content types from more than 10,000 providers. All content in Summon is centrally indexed.

- All content in the Summon index is searchable at the same time with no reliance on federated search, XML APIs or other database platform technologies.
- The index is comprised of individual library catalogues and institutional repositories; publisher and aggregation databases; and open access repositories, open websites, index databases and enrichment sources.
- The Summon service provides a single, unified result set from a single index.
- All content in the Summon service is treated equally. There is no bias in terms of relevance or content covered toward any one vendor platform or group of databases.
- Content is mostly de-duplicated prior to indexing.
- Local catalog records are pre-harvested into the index and MARC fields are mapped to the Summon index schema based on MODS. Libraries have control over this process and can submit custom-mapping criteria.
- Institutional Repositories are harvested and ingested into the Summon Unified index.

Summon also supports Union catalogs and provides an “institution” facet that allows patrons to limit catalog results to a particular library or libraries’ holdings. Because the Summon Service does not index content by database or package, but rather matches and merges content at the item level, they do not provide facets based on database.

For libraries that have subscriptions, these can be separately tracked within the Summon Service and turned on, e.g., become discoverable, by the library’s patrons. Discovery of items that require ILL is also possible by selecting to see results beyond the library’s collection.

ProQuest Workflow Solutions content alliance works with publishers and other content providers to form agreements to include provider metadata and full-text.

Summon incorporates feeds from Ulrich’s for peer-reviewed status, and descriptors/subject terms from author-supplied keywords, through indexing provided by ProQuest, Gale, Web of Science, and others, to the feeds direct from primary publishers which enable Summon in the majority of cases, to index the article’s full-text.

Although ProQuest does not provide content with Summon, approximately 72 percent of the records in the Summon Index are from Commercial and Open Access resources that are available for clients to access based on their individual subscriptions.

Libraries can display or hide material from specific vendors or journals. They can also decide whether to display citations and/or full-text.

The look and feel of Summon can be changed using the Customizer Tool. It allows libraries to customize their logos, default languages, facets, number of results, Database Recommendations, Best Bets, custom linking, record prioritization, institutional facet whitelisting, Union Catalog participant record prioritization institutional and branding.

Summon allows custom HTML headers and footers which allow libraries to integrate custom messages, custom links, third party widgets and navigational structure to the user interface.

Pre-scoped searches and search boxes, as well as modified facet/limiter options, are also available. Libraries can embed Summon search boxes in any web-environment and have flexibility as to how those search boxes are scoped.

Summon also offers an API that provides opportunities to feed Summon data into any custom interface or custom application the library desires.

Users can create lists of search results including the ability to email, print, modify citation format, and export citations directly into Endnote, RefWorks, Zotero and other bibliographic management tools via a session based folder.

The Summon Service uses two scores, the Dynamic Rank and Static Rank, to define relevancy. Dynamic rank focuses on matching a user's exact query with all of the metadata and fulltext in the Summon index and is the more important of the two. It leverages concepts such as:

- Proximity
- Term frequency
- Inverse frequency
- Field weighting
- Term stemming
- Stop-word processing
- Synonyms
- Language processing
- Free-form identifiers
- Cut-and-paste excerpts

Static Rank focuses on the item itself and helps boost relevance based on attributes of an item that can be critical in a research environment. Static factors include:

- Content type
- Scholarly/peer-reviewed

- Publication date
- Citation counts
- Local collections
- Content size

This algorithm boosts local content so that they are more easily discoverable by patrons. Other resources cannot be privileged in this way.

A third component of relevance is recommendations. These recommendations guide users to additional relevant content and assist them in refining their searches.

- Library-curated recommendations: Libraries are able to direct users to additional relevant information via “Best Bets.” Completely controlled by the library, Best Bets promote specific library resources such as research guides, specialized collections, library web pages, course reserves, announcements, current events, important contacts, library hours, and help tools.
- Database Recommender: Blending library control, community-sourced tags and relevance-based recommendations, this feature points users to specialized databases for targeted research and discipline specific searching.
- Related search suggestions: Related search suggestions dynamically display, encouraging users to expand their query to aid their research.

Although there is no functionality that integrates Summon materials into specific social media sites, the service’s API, RSS and persistent search URLs allow Summon results to be embedded into any social networking or collaboration site. Summon URLs are persistent and contain all facets and limiters applied during the query.

There is currently no native solution within Summon that provides the ability to tag, rate, or review citations by the patrons. Libraries can use the Summon API to extend to this capability.

ProQuest is active in several standards organizations and their working groups such as KBART and NISO’s Open Discovery Initiative (ODI). They have published a summary of their compliance for ODI and continue to improve the product to adhere to appropriate standards.

If an institution identifies a database Summon does not currently cover, they will engage the database provider and try to incorporate that database into the index. If the database cannot be incorporated, librarians can direct patrons to the native interface.

Libraries can map metadata for local content, but ProQuest manages metadata and fulltext for publisher content.

Summon supports the following authentication methods:

- OCLC’s EZProxy
- Innovative Interface’s WAM
- Any web-based authentication proxy that uses prepending URL rewriting to support IP-based authentication

- An institution-wide VPN

Summon Analytics logs and reports dozens of key metrics with a high degree of granularity and configurability, allowing member libraries to assess how the Summon service is being used at their library. It tracks traditional metrics such as number of sessions and number of searches, and also provides behavioral analysis and user profiling reports to show libraries how users interact with the Summon service. Search queries are also recorded allowing libraries to see the top search trends as well as track queries that may return few results.

Summon Analytics tracks where usage is coming from by IP address and can provide information on usage by individual library, branch, or department. Geo-location mapping gives libraries a visual representation of global usage and more granular tabular reports track usage information by country, region and city. It tracks what browsers and software platforms are used to access the system, including mobile browsers. Summon also provides integration with Google Analytics.

Current development includes:

- Improving overall relevance algorithm and index performance tools for refining searches
- Creating tools for librarians to include more integrated librarian support tailored by them for their users and their needs
- Enhanced navigation and presentation, including recommendations, methods for exploring at a journal or title level, and personalization by the patron
- Research workflow integration, including support for reading list integration and LMS support

Libraries within Texas that use Summon include:

- The University of Texas at Austin: <https://www.lib.utexas.edu/>
- The University of Texas at San Antonio: <http://lib.utsa.edu/>
- The University of Texas at Arlington: <http://library.uta.edu/>
- Comments from libraries that use SeeSearch:

No libraries using Summon provided comments.

SEESEARCH

SeeSearch made its debut in 2014 at the South Dublin Libraries. Based in Ireland, this discovery service came out of research done by Dr. Hilary Kenna, a lecturer in design at Dun Laoghaire Institute of Art, Design and Technology.

For SeeSearch, a discovery service empowers the user to find what they are looking for and to see what else is available within a single easy to use interface. It gives the user a 360° view of a library's content that includes physical and subscription/electronic material and curated sources from the internet.

SeeSearch can include online catalogs (MARC, MARCXML, RDF and Dublin Core), institutional repositories, digitized collections that can be harvested, and open access and/or public domain content. They are working with a number of publishers to bring their content into SeeSearch.

When a library starts using this service, they immediately have access to Europe PubMed, SlideShare, Stack Overflow, YouTube, and Twitter. With a subscription, SeeSearch can provide access to EBSCOHost, IEEE, JSTOR, ScienceDirect, Britannica, ProQuest, WorldCat, Financial Times, Lynda.com, OverDrive, ebrary, and MyiLibrary. The vendors displayed in search results are configurable; any vendor can be removed or filtered by the library.

If a database is not part of SeeSearch's current index, they will try to bring that content in via API or a web service. If these do not exist, they will approach the owner for extracts.

Libraries can customize their SeeSearch instance:

- Library's logo and color palette to the header
- Library's Twitter handle
- Display latest items in library's index
- Display events feed

Libraries cannot customize or re-map their metadata.

Citations can be saved, stored, and emailed in the Harvard citation format. Integration of RefMe has begun, allowing citation export to RIS, BibTex and Word.

Relevance ranking of a customer index is by default weighted in the following order:

- Author
- Title
- Subject/genre
- Summary

SeeSearch can work with each library to change the relevancy ranking weightings. If an API is used to call external material, then relevancy is handled by the data source. SeeSearch does not interfile content from multiple sources and does not bias the order content is displayed. This interface allows them to stratify the results from various

sources. They can customize the order in which electronic database content is displayed according to our customer's needs.

Authentication within SeeSearch requires Shibboleth or EZProxy. They are open to working with other authentication types.

Social media integration includes Facebook, Twitter, and Google+. In addition, item record pages are enriched with reviews and recommendations from GoodReads, The Open Library, Google Books, and Amazon. Allowing patrons to rate, tag, and provide reviews is on the development roadmap.

Usage statistics are available to the library:

- Usage by content type
- Time of access
- Number of searches
- Which items are clicked on in the search results list
- Search terms entered

SeeSearch is not currently actively involved in Open Discovery Initiative, but are interested in simplifying data exchange and in providing an unbiased view of library content.

Current development includes:

- Integration of RefMe
- User tagging
- Content from new publishers
- Mobile version

No libraries in Texas are using this service. Other organizations include:

- Dun Laoghaire Institute of Art, Design and Technology:
<http://labs.vizolve.com/SeeSearch/iadt/home>
- South Dublin Libraries: <http://labs.vizolve.com/SeeSearch/scd/home>

Comments from libraries that use SeeSearch:

- What do you like the best about SeeSearch?
 - Remote access to electronic resources and subscription content is seamless
 - Students and faculty find it easy to use
 - Students with specific learning requirements, like Dyslexia, love its simplicity

VUFIND

VuFind is a discovery layer and search engine. It is customizable and capable of presenting multiple data formats in a single user-friendly interface. VuFind is currently supporting thousands of libraries, museums, and archives world-wide.

VuFind is an open source PHP library search engine that allows patrons to search and browse catalogs as well as other databases. Created by Villanova University in 2010, it operates with a Google-like interface and offers keyword searching. The software is modular and highly configurable, allowing implementers to choose system components to best fit their needs.

The latest version, 2.4, minimally includes support for Piwik analytics, a DPLA recommendation module, logging in with Facebook, and RIS export. Primary functionality for VuFind includes:

- Search with faceted results
- Live record status and location (VuFind queries the ILS)
- “More Like This” suggestions
- Save resources to lists
- Browse for resources
- Author biographies
- Persistent URLs
- Zotero-compatible
- Internationalization
- OpenSearch, Open Archives Initiative (OAI), Solr

VuFind does not:

- Have a central index
- Require user authentication, but if needed, can work with LDAP, SIP, Shibboleth, CAS, database, ILS, ChoiceAuth, MultiAuth, and MultiILS

VuFind 2.0 has a flexible system for collecting statistics and includes writers for file-based logs, MySQL tables and Solr. There is a statistics module, but it is very basic, e.g., logging search queries and record hits, with the ability to identify 0-hit results queries separately from others. The COUNTER standard was not taken into consideration during the design process. Google Analytics can be used with VuFind.

There are technical requirements for implementing VuFind:

- Apache HTTP Server 2.2 or greater
- PHP version 5.4 or greater
- MySQL 4.1 or greater
- Java J2SE JDK 1.7 or greater
- Windows or Linux operating systems
- Cascading Style Sheets
- HTML

As it is open source, the library can modify branding and functionality to fit its needs.

Relevancy can be modified by the library and is created primarily by changing the weighting and fuzziness of specific types of searches.

Although not part of the software, social media can be integrated using plug-ins such as AddThis. Tagging and commenting are available in the software.

Major priorities for current development is focusing on:

- Implement FRBR
- Suggested Resources and Searches
- Better native support for consortia
- Build shared index of open content
- OverDrive integration

Libraries in Texas that use VuFind include:

- Kilgore College Library: <http://library.kilgore.edu/vufind/index.html>
- Stephen F Austin State University, Ralph W Steen Library: <https://library.sfasu.edu/find/>

APPENDIX B

WHAT TO LOOK FOR IN A DISCOVERY SERVICE CHECKLIST

- ☐ Usage Statistics Functionality (minimum):
 - ☐ Total number of searches
 - ☐ Result clicks
 - ☐ Total number of click-throughs
 - ☐ Total number of searches per month
 - ☐ Total number of unique visitors per month
 - ☐ Total number of click-throughs per month
 - ☐ Top 500 search queries for the last period
 - ☐ Top 100 referring URLs to the discovery service for the last period
- ☐ Relevancy Ranking Practices:
 - ☐ Ascertain how relevancy is determined; can it be modified by the library?
 - ☐ Is the ranking of search results objective?
 - ☐ Can specific providers or types of documents be privileged?
 - ☐ Does the relevancy ranking algorithm provide results helpful for your patrons?
- ☐ Central index:
 - ☐ Which databases are available in the central index?
 - ☐ What is the quality of the metadata?
 - ☐ Does it include the types of materials you need, e.g., full-text, citations, journal backfiles?
 - ☐ Is the full-text searchable?
- ☐ Discovery layer:
 - ☐ Does it include advanced searching options, facets, and limiters? Are they easy to understand and use?
 - ☐ Does it include end-user features helpful for your patrons, e.g., lists, tagging, citation export, and social media integration?
 - ☐ Can you customize the look and feel or branding of the website? Are widgets and APIs available?
 - ☐ Can results be enhanced with cover art, recommendation engines, or other external information?
 - ☐ How usable is the site for patrons?

(From Open Discovery Initiative and Hoepfner 2012)

APPENDIX C

EVALUATING YOUR DISCOVERY SERVICE CHECKLIST

- ☐ Evaluate decisions made during the implementation process.
- ☐ Utilize patron feedback to inform and ameliorate future workflows.
- ☐ Analyze the goals of implementing a discovery service. Were they achieved?
- ☐ Vendor Company:
 - ☐ Understand the contractual agreements between you and the vendor.
 - ☐ Understand the type of support you will receive from the vendor as part of your agreement; evaluate that experience. Focus on:
 - ☐ Company stability
 - ☐ Quality of their staff
 - ☐ Your experience during support interactions (outside the implementation process)
 - ☐ Quality of help they make available
 - ☐ The process through which they handle conflict
 - ☐ How they handle system updates and technical support
- ☐ Resource Coverage and Indexing:
 - ☐ Measure resource usage against what the vendor advertises
 - ☐ Work alongside your vendor to understand what items are discoverable
 - ☐ Perform searches that cover full text, subject headings, and abstracts
 - ☐ Review search default settings for your institution
- ☐ Usage Statistics:
 - ☐ Through this data, which portion of library resources are your patrons finding through the discovery service?
 - ☐ What types of information are they accessing through other resources?
- ☐ Relevance Rankings:
 - ☐ Understand which resources are rising to the top of their search results for given searches
 - ☐ Run searches to discover if the vendor's own data will appear at the top of the search results first or a combination of sources
- ☐ Testing:
 - ☐ Identify the resources and tools through which you will gather testing data
 - ☐ Build your network of resources, e.g., other colleagues who are using the same system, and solicit their advice when building test scenarios
 - ☐ Maintain a working relationship with your subscription vendor and utilize their help in connecting you to other sources in your region
 - ☐ Build your own scenarios based on patron feedback
 - ☐ Build survey forms that display after patron search sessions

- ☐ Follow-up with patrons via telephone or face-to-face interviews to capture the user experience
- ☐ Rely on focus group feedback to determine enhancements to the services
- ☐ Trends:
 - ☐ Be aware of new developments or enhancements to your system.
 - ☐ Collect information from the vendor, e.g., technical information, case studies from other institutions with the same patron demographic
 - ☐ Attend seminars, conferences or other on-going focus group meetings
 - ☐ Participate in focus groups that seek to improve your system's operation

APPENDIX D

ADVICE FOR LIBRARIES CONSIDERING THEIR FIRST DISCOVERY SERVICE FROM LIBRARIES THAT HAVE ALREADY IMPLEMENTED

Decide what you want the discovery service to do for your library. Not every discovery service fits every library. Find the one that fits your library best. Do a cost/benefit analysis to see whether you really need a discovery service.

Don't fall for the "it will all be in one place" mantra; there are databases that do not work well in a discovery environment. Accept that it will never be perfect. There will always be content that your discovery service does not capture, or does not capture well.

Decision-makers should be involved in the choice of the product and what it does. It is difficult to get buy-in from staff if it is imposed upon them; try to bring them into testing.

Use other library's discovery services, ask for test credentials, and talk to them about their experiences. Try to test the discovery system with your own library's catalog. Bring your cataloger into this testing. The library should do a test export from their library ILS into the Discovery Service to determine how easy the process is and how accurate the results display. Test discovery services side by side, and not one after another.

Find out how you can integrate local resources and to what extent you can limit or provide facets for them. Provide a list of sources that you own or subscribe to for the vendor. Ask what percentage they cover and which specific sources they cover.

Do not launch the discovery service until it is ready. Spend time in the test environment, making all your changes there, until you are comfortable. Launch the discovery service during a slow time in the library.

To configure a discovery service to do what you want will take more time and staff than you think.

Talk to libraries that are not on the vendor's list of recommended sites.

Ask libraries about support and follow-through after the purchase. Are promises kept? Test their support system, if possible.

Consider training library staff even though discovery services should be relatively easy to use. This can help in convincing staff to use it.

Set up an implementation team that includes those that are for and against discovery, as well as representatives from both public and technical services. Assign someone on your team to be the primary contact between the library and vendor.

If your ILS vendor has a discovery service, seriously consider it, as there will most likely be a tight integration between the two.

Be aware of how your vendors authenticate. How compatible will that be with the service you want to use. Not all discovery vendors can support all authentication schemes.

If you like your link resolver, look seriously at the discovery vendor that uses it.

Find the service that includes most of your major resources and is well integrated with your link resolver knowledge base.

Be sure to promote to your patrons what a discovery service is and how it is different from your regular catalog or website. Patrons expect that everything in a library's catalog is in the library; with a discovery service, there might be confusion as they start seeing materials that are not owned by the library.

APPENDIX E

BIBLIOGRAPHY (2012-PRESENT)

- American Libraries Live (2013, December 5). AL Live: Making the Discovery Decision [Video file]. Retrieved from <http://www.youtube.com/watch?v=ggawogO-EaM>.
- American Libraries Live (2013, August 1). Discovery Services: The Future of Library Systems | American Libraries Live [Video file]. Retrieved from <http://americanlibrarieslive.org/discovery-services-future-library-systems>.
- Asher, Andrew D., Duke, Lynda M., & Wilson, Suzanne (2013). Paths of discovery: Comparing the search effectiveness of EBSCO discovery service, Summon, Google Scholar, and conventional library resources. *College & Research Libraries*, 74(5), 464-488.
- Belford, Rebecca (2012). Evaluating Library Discovery Tools through a Music Lens. *LRTS*, 58(1), 49-72.
- BiblioCommons | Origins*. (2013). Retrieved from <http://www.bibliocommons.com/about/origins>.
- Bradley, Eric, Szpunar, Ruth & West, Megan (2015). *WorldCat Discovery Usability Report*. Retrieved from <https://docs.google.com/document/d/1ZwHMwDuwqTU18jWDoir3eozWip3z72cYrxf1BwqOt4/edit#>.
- Bradley, Eric, Szpunar, Ruth & West, Megan (2015). Collaborative UX Testing: Cardigans Included. *ACRL TechConnect Blog*. Retrieved from <http://acrl.ala.org/techconnect/?p=5118>.
- Breeding, Marshall (2015, February). *The Future of Library Resource Discovery: a white paper commissioned by the NISO Discovery to Delivery (D2D) Topic Committee*. Retrieved from http://www.niso.org/apps/group_public/download.php/14487/future_library_resource_discovery.pdf.
- Breeding, Marshall (2014, January). Library Resource Discovery Products: Context, Library Perspectives, and Vendor Positions. *Library Technology Reports*, 50(1).
- Breeding, Marshall (2014, April 15). Library Systems Report. *American Libraries*. Retrieved from <http://www.americanlibrariesmagazine.org/article/library-systems-report-2014>.
- Breeding, Marshall (2014, January 14). Web-Scale Discovery Services. *American Libraries*. Retrieved from <http://www.americanlibrariesmagazine.org/article/web-scale-discovery-services>.

- Burns, Sean C. (2014). Academic Libraries and Open Access Strategies. *Advances in Library Administration and Organization*, 32, 147-211. doi:10.1108/S0732-067120140000032003.
- Calvert, Kristin (2015). Maximizing academic library collections: measuring changes in use patterns owing to EBSCO Discovery Service. *College & Research Libraries*. Retrieved from <http://crl.acrl.org/content/early/2014/01/17/crl13-557.abstract>.
- Colson, Jeannie & Allen, Kelly. (2015). Our trek to discovery: a tale of implementation. *Online Searcher*, 39(2). Retrieved from <http://www.infotoday.com/OnlineSearcher/Articles/Features/Our-Trek-to-Discovery-A-Tale-of-Implementation-102366.shtml>.
- Deodato, Joseph. 2015. "Evaluating Web-Scale Discovery: A Step-by-Step Guide." *Information Technology and Libraries (Online)* 34 (2): 19-75. <http://search.proquest.com/docview/1691586135?accountid=7113>.
- Djenno, Mireille, Insua, Glenda, Gregory, Gwen M & Brantley, John S. (2014). Discovery usability: Comparing two discovery systems at one academic library. *Journal of Web Librarianship*, 8(3), 263-285. DOI: 10.1080/19322909.2014.933690.
- EBSCO and Ex Libris > Orbis Cascade Alliance. (2013). Retrieved from <https://www.orbiscascade.org/ebSCO-ex-libris/>.
- Ellero, Nadine P. (2013). Integration or Disintegration: Where Is Discovery Headed? *Journal of Library Metadata*, 13(4), 311-329. doi:10.1080/19386389.2013.831277.
- Ellero, Nadine P. (2013). An Unexpected Discovery: One Library's Experience with Web-Scale Discovery Service (WSDS) Evaluation and Assessment. *Journal of Library Administration*, 53(5-6), 323-343. doi:10.1080/01930826.2013.876824.
- Florida Virtual Campus, (n.d.). *Discovery Tools Futures*. Retrieved from <https://fclaweb.fcla.edu/node/2143>.
- Foster, Anita K., & MacDonald, Jean B. (2013). A Tale of Two Discoveries: Comparing the Usability of Summon and EBSCO Discovery Service. *Journal of Web Librarianship*, 7(1), 1-19. doi:10.1080/19322909.2013.757936.
- Fry, Amy (2014). Technical Services Report: Usability, the User Experience and Interface Design: The Role of Reference. A Report of the Reference and User Services Association (RUSA) MARS Emerging Technologies in Reference Chair's Program, American Library Association Annual Conference. *Technical Services Quarterly*, 31(1), 70-72. doi:10.1080/07317131.2014.845003.
- Goodsett, Mandi. 2014. "Discovery Search Tools: A Comparative Study." *Reference Reviews* 28 (6): 2-8. <http://search.proquest.com/docview/1625604836?accountid=7113>.
- Hawkins, Don (2013, October 28). *Discovery Services for Libraries*. Retrieved March 30, 2014, from <http://www.libconf.com/2013/10/28/discovery-services-libraries/>.

Hoepfner, Athina (2012). The Ins and Outs of Evaluating Web-Scale Discovery Services. *Computers in Libraries*, 32(3), 6-11. Retrieved from <http://www.infotoday.com/cilmag/apr12/Hoepfner-Web-Scale-Discovery-Services.shtml>.

Kelley, Michael (2013). EBSCO Focuses on Discovery, *Library Journal*, (p.36-38). http://www.ebscohost.com/uploads/newsroom/docs/EBSCO_Focuses_on_Discovery_-_Library_Journal_Article.pdf.

LaGuardia, Cheryl (2014). Hurrah! For Discovery and for Transparency in Discovery | Not Dead Yet. *Library Journal*. Retrieved August 8, 2014 from <http://lj.libraryjournal.com/2014/08/opinion/not-dead-yet/hurrah-for-discovery-and-for-transparency-in-discovery-not-dead-yet/>.

Lown, Cory, Sierra, Tito, & Boyer, Josh (2013). How users search the library from a single search box. *College & Research Libraries*, 74(3), 227-241.

Lundrigan, Courtney, Manuel, Kevin, & Yan, May (2015). "Pretty Rad": Explorations in User Satisfaction with a Discovery Layer at Ryerson University. *College & Research Libraries*. Retrieved from <http://crl.acrl.org/content/early/2014/01/17/crl13-514.full.pdf>.

Niu, Xi, Zhang, Tao, & Chen, Hsin-liang (2014). Study of User Search Activities with Two Discovery Tools at an Academic Library. *International Journal of Human-Computer Interaction*, 30(5), 422-433. doi:10.1080/10447318.2013.873281.

Open Discovery Initiative: Promoting Transparency in Discovery (2014). Retrieved June 30, 2014 from <http://www.niso.org/workrooms/odi/>.

Perrin, Joy Marie, Melanie Clark, Esther De-Leon, and Lynne Edgar. 2014. "Usability Testing for Greater Impact: A Primo Case Study." *Information Technology & Libraries* 33, no. 4: 57-66. Professional Development Collection, EBSCOhost (accessed August 23, 2015).

Pohl, Adrian (2013, June 23). *Discovery silos vs. the open web* | *Open Bibliography and Open Bibliographic Data*. Retrieved March 30, 2014, from <http://openbiblio.net/2013/06/23/discovery-silos-vs-the-open-web/>.

Ramsay, Malcolm & Edmund Chamberlain (2012). Software Selection Methodology for Library Discovery Layer Systems. Retrieved August 11, 2014 from <https://foss4lib.org/decision-support/discovery-layer-ssm>.

Singley, Emily (2014, March 18). *Discovery systems - testing known item searching | usable libraries*. Retrieved March 30, 2014, from <http://emilysingley.net/discovery-systems-testing-known-item-searching/>.

Tammaro, Anna Maria, Casarosa, Vittore, & Castelli, Donatella (2014). Closing the Gap: Interdisciplinary Perspectives on Research and Education for Digital Libraries. *Communications in Computer and Information Science*, 385, 187-197. doi:10.1007/978-3-642-54347-0_20.

Thompson, JoLinda L., Obrig, Kathe S., & Abate, Laura E. (2013). Web-scale discovery in an academic health sciences library: Development and implementation of the EBSCO discovery service. *Medical Reference Services Quarterly*, 32(1). Retrieved from 26-41.

Walters, William H. (2013). E-books in academic libraries: challenges for discovery and access. *Serials Review*, 39(2), 97-104.

Warfield, Fintan (2014). SeeSearch – One Stop Online Discovery for All Library Content. Retrieved August 15, 2015 from <http://www.fintanwarfield.com/seesearch-one-stop-online-discovery-for-all-library-content/>.

Yang, Sharon Q. 2014. "Charting Discovery System Improvements (2010-2013)." *Computers in Libraries* 34 (8): 10-14.
<http://search.proquest.com/docview/1625138501?accountid=7113>.

APPENDIX F

2015 UPDATE CHANGES

During the weeks of August 3rd and August 10th, 2015, libraries were asked to attend informal online meetings specific to their discovery vendors to provide answers to these three questions:

- What do you like the best about your discovery service?
- What do you like the least about your discovery service?
- If you could give advice to a library looking for their first discovery service, what would it be?

A heartfelt thank you goes out to the following libraries that participated:

- Abilene Public Library
- Austin Public Library
- Institute of Art, Design and Technology
- Hardin-Simmons University
- Houston Baptist University
- Lee College
- Midwestern State University
- Southwestern Assemblies of God
- Texas A&M International University
- Texas State University
- University of St Thomas
- The University of Texas at El Paso
- The University of Texas at Tyler
- The University of Texas of the Permian Basin
- West Texas A&M University

In addition, each vendor was contacted to update their information for this white paper. Innovate Encore never responded, so their section was not updated. Other vendors either provided answers to specific questions or a Request for Information document. SeeSearch was added in the 2015 edition.

In the Bibliography, references to 2011 citations were removed, and 2015 references added.